General

Guideline Title

Guideline: updates on the management of severe acute malnutrition in infants and children.

Bibliographic Source(s)

World Health Organization (WHO). Guideline: updates on the management of severe acute malnutrition in infants and children. Geneva (Switzerland): World Health Organization (WHO); 2013. 115 p. [167 references]

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

The rating schemes for the quality of the evidence (very low, low, moderate, high) and the strength of the recommendations (weak/conditional, strong) are defined at the end of the "Major Recommendations" field.

Admission and Discharge Criteria for Children Who Are 6–59 Months of Age with Severe Acute Malnutrition

Criteria for Identifying Children with Severe Acute Malnutrition for Treatment

- In order to achieve early identification of children with severe acute malnutrition in the community, trained community health workers and community members should measure the mid-upper arm circumference of infants and children who are 6–59 months of age and examine them for bilateral pitting oedema. Infants and children who are 6–59 months of age and have a mid-upper arm circumference <115 mm, or have any degree of bilateral oedema, should be immediately referred for full assessment at a treatment centre for the management of severe acute malnutrition (strong recommendation, low quality evidence).
- In primary health-care facilities and hospitals, health-care workers should assess the mid-upper arm circumference or the weight-for-height/weight-for-length status of infants and children who are 6–59 months of age and also examine them for bilateral oedema. Infants and children who are 6–59 months of age and have a mid-upper arm circumference <115 mm or a weight-for-height/length <–3 Z-score[1] of the World Health Organization (WHO) growth standards, or have bilateral oedema, should be immediately admitted to a programme for the management of severe acute malnutrition (strong recommendation, low quality evidence).

Criteria for Inpatient or Outpatient Care[2]

Children who are identified as having severe acute malnutrition should first be assessed with a full clinical examination to confirm whether they have medical complications and whether they have an appetite. Children who have appetite (pass the appetite test) and are clinically well and alert should be treated as outpatients. Children who have medical complications, severe oedema (+++),[3] or poor appetite (fail the appetite test), or present with one or more Integrated Management of Childhood Illness (IMCI) danger signs[4] should be treated as inpatients (strong recommendation, low quality evidence).

Criteria for Transferring Children from Inpatient to Outpatient Care[1]

Children with severe acute malnutrition who are admitted to hospital can be transferred to outpatient care when their medical complications, including oedema, are resolving and they have a good appetite, and are clinically well and alert. The decision to transfer children from inpatient to outpatient care should be determined by their clinical condition and not on the basis of specific anthropometric outcomes such as a specific mid-upper arm circumference or weight-for-height/length (strong recommendation, low quality evidence).

Criteria for Discharging Children from Treatment

- Children with severe acute malnutrition should only be discharged from treatment when their:
  - Weight-for-height/length is ≥–2 Z-score and they have had no oedema for at least 2 weeks, or
  - Mid-upper-arm circumference is ≥125 mm and they have had no oedema for at least 2 weeks
- The anthropometric indicator that is used to confirm severe acute malnutrition should also be used to assess whether a child has reached nutritional recovery, i.e., if mid-upper arm circumference is used to identify that a child has severe acute malnutrition, then mid-upper arm circumference should be used to assess and confirm nutritional recovery. Similarly, if weight-for-height is used to identify that a child has severe acute malnutrition, then weight-for-height should be used to assess and confirm nutritional recovery.
- Children admitted with only bilateral pitting oedema should be discharged from treatment based on whichever anthropometric indicator, mid-upper arm circumference or weight-for-height is routinely used in programmes.
- Percentage weight gain should not be used as a discharge criterion

(strong recommendation, low quality evidence)

Follow-up of Infants and Children after Discharge from Treatment for Severe Acute Malnutrition

Children with severe acute malnutrition who are discharged from treatment programmes should be periodically monitored to avoid a relapse (strong recommendation, low quality evidence).

Where to Manage Children with Severe Acute Malnutrition Who Have Oedema

Children with severe acute malnutrition who have severe bilateral oedema (+++),[3] even if they present with no medical complications and have appetite, should be admitted for inpatient care (strong recommendation, very low quality evidence).

Use of Antibiotics in the Management of Children with Severe Acute Malnutrition in Outpatient Care

- Children with uncomplicated severe acute malnutrition, not requiring to be admitted and who are managed as outpatients, should be given a course of oral antibiotic such as amoxicillin (conditional recommendation, low quality evidence).
- Children who are undernourished but who do not have severe acute malnutrition should not routinely receive antibiotics unless they show signs of clinical infection (strong recommendation, low quality evidence).

Vitamin A Supplementation in the Treatment of Children with Severe Acute Malnutrition

- Children with severe acute malnutrition should receive the daily recommended nutrient intake of vitamin A throughout the treatment period. Children with severe acute malnutrition should be provided with about 5000 IU vitamin A daily, either as an integral part of therapeutic foods or as part of a multi-micronutrient formulation (strong recommendation, low quality evidence).
- Children with severe acute malnutrition do not require a high dose of vitamin A as a supplement if they are receiving F-75, F-100[5] or ready-to-use therapeutic food that complies with WHO specifications (and therefore already contains sufficient vitamin A), or vitamin A is part of other daily supplements (strong recommendation, low quality evidence).
- Children with severe acute malnutrition should be given a high dose of vitamin A (50,000 IU, 100,000 IU or 200,000 IU, depending on age) on admission, only if they are given therapeutic foods that are not fortified as recommended in WHO specifications and vitamin A is not part of other daily supplements (strong recommendation, low quality evidence).

Therapeutic Feeding Approaches in the Management of Severe Acute Malnutrition in Children Who Are 6–59 Months of Age

Children with severe acute malnutrition who present with either acute or persistent diarrhoea, can be given ready-to-use therapeutic food in the same way as children without diarrhoea, whether they are being managed as inpatients or outpatients (strong recommendation, very low quality evidence).

In Inpatient Settings, Where Ready-to-Use Therapeutic Food Is Provided as the Therapeutic Food in the Rehabilitation Phase (Following F-75 in the Stabilization Phase)

Once children are stabilized, have appetite and reduced oedema and are therefore ready to move into the rehabilitation phase, they should transition from F-75 to ready-to-use therapeutic food over 2 to 3 days, as tolerated. The recommended energy intake during this period is 100–135 kcal/kg/day. The optimal approach for achieving this is not known and may depend on the number and skills of staff available to supervise feeding and monitor the children during rehabilitation (strong recommendation, very low quality evidence). Two options for transitioning children from F-75 to ready-to use therapeutic food are suggested:

- Start feeding by giving ready-to-use therapeutic food as prescribed for the transition phase. Let the child drink water freely. If the child does not take the prescribed amount of ready-to-use therapeutic food, then top up the feed with F-75. Increase the amount of ready-to-use therapeutic food over 2 to 3 days until the child takes the full requirement of ready-to-use therapeutic food, or
- Give the child the prescribed amount of ready-to-use therapeutic food for the transition phase. Let the child drink water freely. If the child does not take at least half the prescribed amount of ready-to-use therapeutic food in the first 12 h, then stop giving the ready-to-use therapeutic food and give F-75 again. Retry the same approach after another 1 to 2 days until the child takes the appropriate amount of ready-to-use therapeutic food to meet energy needs.

In Inpatient Settings Where F-100 Is Provided as the Therapeutic Food in the Rehabilitation Phase

Children who have been admitted with complicated severe acute malnutrition and are achieving rapid weight gain on F-100 should be changed to ready-to-use therapeutic food and observed to ensure that they accept the diet before being transferred to an outpatient programme (strong recommendation, very low quality evidence).

Fluid Management of Children with Severe Acute Malnutrition

- Children with severe acute malnutrition who present with some dehydration or severe dehydration but who are not shocked should be rehydrated slowly, either orally or by nasogastric tube, using oral rehydration solution for malnourished children (5–10 mL/kg/h up to a maximum of 12 h) (strong recommendation, low quality evidence).
- Full-strength, standard WHO low-osmolarity oral rehydration solution (75 mmol/L of sodium) should not be used for oral or nasogastric rehydration in children with severe acute malnutrition who present with some dehydration or severe dehydration. Give either ReSoMal[6] or half-strength standard WHO low-osmolarity oral rehydration solution with added potassium and glucose, unless the child has cholera or profuse watery diarrhoea (strong recommendation, low quality evidence).
    - *Dissolve one sachet of standard WHO low-osmolarity oral rehydration solution in 2 L water (instead of 1 L). Add 1 level scoop of commercially available combined minerals and vitamins mix[7] or 40 ml of mineral mix solution, and add and dissolve 50 g of sugar. In some countries, sachets are available that are designed to make 500 mL of standard WHO low-osmolarity oral rehydration solution. In this situation, dilution can be revised to add 1 L.*
- ReSoMal (or locally prepared ReSoMal using standard WHO low-osmolarity oral rehydration solution) should not be given if children are suspected of having cholera or have profuse watery diarrhoea.[8] Such children should be given standard WHO low-osmolarity oral rehydration solution that is normally made, i.e., not further diluted (strong recommendation, low quality evidence).
- Children with severe acute malnutrition and signs of shock or severe dehydration and who cannot be rehydrated orally or by nasogastric tube should be treated with intravenous fluids, either:
    - Half-strength Darrow's solution with 5% dextrose, or
    - Ringer's lactate solution with 5% dextrose

  If neither is available, 0.45% saline + 5% dextrose should be used (conditional recommendation, very low quality evidence).

Management of Human Immunodeficiency Virus (HIV)-infected Children with Severe Acute Malnutrition

- Children with severe acute malnutrition who are HIV infected and who qualify for lifelong antiretroviral therapy should be started on antiretroviral drug treatment as soon as possible after stabilization of metabolic complications and sepsis. This would be indicated by return of appetite and resolution of severe oedema. HIV-infected children with severe acute malnutrition should be given the same antiretroviral drug treatment regimens, in the same doses, as children with HIV who do not have severe acute malnutrition. HIV-infected children with severe acute malnutrition who are started on antiretroviral drug treatment should be monitored closely (inpatient and outpatient) in the first 68 weeks following initiation of antiretroviral therapy, to identify early metabolic complications and opportunistic infections (strong

recommendation, very low quality evidence).

- Children with severe acute malnutrition who are HIV infected should be managed with the same therapeutic feeding approaches as children with severe acute malnutrition who are not HIV infected (strong recommendation, very low quality evidence).
- HIV-infected children with severe acute malnutrition should receive a high dose of vitamin A on admission (50,000 IU to 200,000 IU depending on age) and zinc for management of diarrhoea, as indicated for other children with severe acute malnutrition, unless they are already receiving F-75, F-100 or ready-to-use therapeutic food, which contain adequate vitamin A and zinc if they are fortified following the WHO specifications (strong recommendation, very low quality evidence).
- HIV-infected children with severe acute malnutrition in whom persistent diarrhoea does not resolve with standard management should be investigated to exclude carbohydrate intolerance and infective causes, which may require different management, such as modification of fluid and feed intake, or antibiotics (strong recommendation, very low quality evidence).

Identifying and Managing Infants Who Are Less Than 6 Months of Age with Severe Acute Malnutrition

- Infants who are less than 6 months of age with severe acute malnutrition and any of the following complicating factors should be admitted for inpatient care:
  - Any serious clinical condition or medical complication as outlined for infants who are 6 months of age or older with severe acute malnutrition
  - Recent weight loss or failure to gain weight
  - Ineffective feeding (attachment, positioning and suckling) directly observed for 15 to 20 min, ideally in a supervised separated area
  - Any pitting oedema
  - Any medical or social issue needing more detailed assessment or intensive support (e.g., disability, depression of the caregiver, or other adverse social circumstances)

  (strong recommendation, very low quality evidence)

- Infants who are less than 6 months of age with severe acute malnutrition should receive the same general medical care[9] as infants with severe acute malnutrition who are 6 months of age or older:
  - Infants with severe acute malnutrition who are admitted for inpatient care should be given parenteral antibiotics to treat possible sepsis and appropriate treatment for other medical complications such as tuberculosis, HIV, surgical conditions or disability.
  - Infants with severe acute malnutrition who are not admitted should receive a course of broad-spectrum oral antibiotic, such as amoxicillin, in an appropriately weight-adjusted dose.

  (strong recommendation, very low quality evidence)

- Feeding approaches for infants who are less than 6 months of age with severe acute malnutrition should prioritize establishing, or re-establishing, effective exclusive breastfeeding by the mother or other caregiver (strong recommendation, very low quality evidence).
- Infants who are less than 6 months of age with severe acute malnutrition and who are admitted:
  - Should be breastfed where possible and the mothers or female caregivers should be supported to breastfeed the infants. If an infant is not breastfed, support should be given to the mother or female caregiver to re-lactate. If this is not possible, wet nursing[10] should be encouraged.
  - Should also be provided a supplementary feed:
    - Supplementary suckling approaches should, where feasible, be prioritized.
    - For infants with severe acute malnutrition but no oedema, expressed breast milk should be given, and, where this is not possible, commercial (generic) infant formula or F-75 or diluted F-100[11] may be given, either alone or as the supplementary feed together with breast milk.
    - For infants with severe acute malnutrition and oedema, infant formula or F-75 should be given as a supplement to breast milk.
  - Should not be given undiluted F-100 at any time (owing to the high renal solute load and risk of hypernatraemic dehydration)
  - If there is no realistic prospect of being breastfed, should be given appropriate and adequate replacement feeds such as commercial (generic) infant formula, with relevant support to enable safe preparation and use, including at home when discharged.
  - In addition:
    - Assessment of the physical and mental health status of mothers or caregivers should be promoted and relevant treatment or support provided.

  (strong recommendation, very low quality evidence)

- Infants who are less than 6 months of age and have been admitted to inpatient care can be transferred to outpatient care when:
  - All clinical conditions or medical complications, including oedema, are resolved, and
  - The infant has good appetite, is clinically well and alert, and

- Weight gain on either exclusive breastfeeding or replacement feeding is satisfactory, e.g., above the median of the WHO growth velocity standards or more than 5 g/kg/day for at least 3 successive days, and
- The infant has been checked for immunizations and other routine interventions, and
- The mother or caregiver is linked with needed community-based follow-up and support.

(strong recommendation, very low quality evidence)

- Infants who are less than 6 months of age can be discharged from all care when they are breastfeeding effectively or feeding well with replacement feeds, and
  - Have adequate weight gain, and
  - Have a weight-for-length ≥–2 Z-score

  (strong recommendation, very low quality evidence)

- For infants who are less than 6 months of age with severe acute malnutrition and who do not require inpatient care (see recommendation above), or whose caregivers decline admission for assessment and treatment:
  - Counselling and support for optimal infant and young child feeding should be provided, based on general recommendations for feeding infants and young children, including for low-birth-weight infants.
  - Weight gain of the infant should be monitored weekly to observe changes.
  - If the infant does not gain weight, or loses weight while the mother or caregiver is receiving support for breastfeeding, then he or she should be referred to inpatient care.
  - Assessment of the physical and mental health status of mothers or caregivers should be promoted and relevant treatment or support provided.

  (strong recommendation, very low quality evidence)

Footnotes

[1]A Z-score equates to one standard deviation.

[2]Necessary resources and services need to be in place if children are referred to outpatient care.

[3]+ Mild: both feet; ++ moderate: both feet, plus lower legs, hands, or lower arms; +++ severe: generalized oedema including both feet, legs, hands, arms and face. Source: Module 2. Principles of care. In: *WHO training course on the management of severe malnutrition*. Geneva: World Health Organization; 2002 (updated 2009).

[4]Danger signs: unable to drink or breastfeed; vomits everything; has had convulsions (more than one or prolonged >15 min); lethargic or unconscious; convulsing now.

[5]F-75 and F-100 are formula diets used for the management of children with severe acute malnutrition in inpatient care. F-75 (75 kcal or 315 kJ/100 mL) is used during the initial phase of treatment, while F-100 (100 kcal or 420kJ/100 mL) is used during the rehabilitation phase.

[6]ReSoMal (short for rehydration solution for severely malnourished children) is the generic name for a powder for the preparation of an oral rehydration solution exclusively for oral or nasogastric rehydration of people suffering from severe acute malnutrition. It must be used exclusively under medical supervision in inpatient care, and must not be given for free use to the mother or caregiver.

[7]A specific electrolyte–micronutrient product formulated according to WHO specifications for use in the management of children with severe acute malnutrition.

[8]Three or more loose or watery stools in a day, for more than 14 days.

[9]Recommendations regarding vitamin A, zinc and other micronutrients were not reviewed in this guideline process.

[10]All potential wet-nurses should be tested for HIV.

[11]Prepared F-100 should be further diluted by adding 30% water.

Definitions:

Strength of Recommendations

Strong recommendations: Strong recommendations communicate the message that the guideline is based on the confidence that the desirable effects of adherence to the recommendation outweigh the undesirable consequences. Strong recommendations are uncommon because the balance between the benefits and harms of implementing a recommendation is rarely certain. In particular, guideline development groups (GDGs) need to be cautious when considering making strong recommendations on the basis of evidence whose quality is low or very low.

Weak/Conditional recommendations: Recommendations that are conditional or weak are made when a GDG is less certain about the balance between the benefits and harms or disadvantages of implementing a recommendation. Conditional recommendations generally include a description of the conditions under which the end-user should or should not implement the recommendation.

Quality of Evidence

High: Further research is very unlikely to change confidence in the estimate of effect.

Moderate: Further research is likely to have an important impact on confidence in the effect.

Low: Further research is very likely to have an important impact on estimate of effect and is likely to change the estimate.

Very Low: Any estimate of effect is very uncertain.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Severe acute malnutrition

Guideline Category

Evaluation

Management

Risk Assessment

Treatment

Clinical Specialty

Family Practice

Infectious Diseases

Nutrition

Pediatrics

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Dietitians

Health Care Providers

Hospitals

Nurses

Other

Physician Assistants

Physicians

Public Health Departments

Guideline Objective(s)

- To provide global, evidence-informed recommendations on a number of specific issues related to the management of severe acute malnutrition in infants and children
- To provide, in conjunction with other World Health Organization (WHO) recommendations, evidence-informed guidance on the care of infants and children with severe malnutrition, including in the context of human immunodeficiency virus (HIV)
- To help Member States and their partners in their efforts to make informed decisions on the appropriate nutrition actions for severely malnourished children, and contribute to achieving the Millennium Development Goals (MDGs), particularly reduction in child mortality (MDG 4)
- To support Member States in their efforts to achieve global targets on the maternal, infant and young child nutrition comprehensive implementation plan, especially global target 1, which entails achieving 40% reduction by 2025 of the global number of children under 5 years who are stunted and global target 6, which aims to reduce and maintain childhood wasting to less than 5%
- To form the basis for a revised manual on the management of severe malnutrition (for physicians and other senior health workers), a training course on the management of severe malnutrition, and other training materials

Target Population

Infants and children younger than 5 years of age with severe acute malnutrition, including children affected with human immunodeficiency virus (HIV) infection

Interventions and Practices Considered

1. Admission and discharge criteria
    - Criteria for identifying children with severe acute malnutrition for treatment
    - Criteria for inpatient or outpatient care
    - Criteria for transferring patients from inpatient to outpatient care
    - Criteria for discharging patients from treatment
    - Follow-up of patients after discharge from treatment
2. Consideration of where to manage children with severe acute malnutrition who have oedema
3. Use of antibiotics
4. Vitamin A supplementation
5. Therapeutic feeding approaches
6. Fluid management
    - Oral rehydration solution
    - Nasogastric tube
    - Intravenous fluids
7. Management of human immunodeficiency virus (HIV)-infected children, including use of antiviral drug treatment
8. Identifying and managing infants who are less than 6 months of age with severe acute malnutrition

Major Outcomes Considered

- Mortality
- Weight gain

Note: Other outcomes considered for each of the guideline questions are detailed in Annex 6 in the original guideline document.

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

The Nutrition Guidance Advisory Group comprised content experts, methodologists, representatives of potential stakeholders and consumers. They met in Geneva, Switzerland on 2–4 June 2010 and formulated the questions to be examined through systematic reviews. The group prioritized the areas of clinical care for which updated guidance is needed and identified what evidence was needed as being critical for decision-making and what other evidence was important or not essential for decision-making.

The World Health Organization (WHO) commissioned 9 background systematic reviews based on the prioritization of questions on the management of severe acute malnutrition that were not covered by the review conducted by the Southampton Health Technology Assessment Centre review: The effectiveness of interventions to treat severe acute malnutrition in young children: a systematic review. Academic groups were identified that were experienced in evidence retrieval, assessment and synthesis.

See the systematic reviews (see the "Availability of Companion Documents" field) for the details of the databases searched, search strategies used, and inclusion and exclusion criteria for each review.

Number of Source Documents

WHO commissioned 9 background systematic reviews based on the prioritization of questions on the management of severe acute malnutrition that were not covered by the review conducted by the Southampton Health Technology Assessment Centre review: The effectiveness of interventions to treat severe acute malnutrition in young children: a systematic review. See the "Availability of Companion Documents" field for the systematic reviews and details of the number of source documents for each.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Quality of Evidence

High: Further research is very unlikely to change confidence in the estimate of effect.

Moderate: Further research is likely to have an important impact on confidence in the effect.

Low: Further research is very likely to have an important impact on estimate of effect and is likely to change the estimate.

Very Low: Any estimate of effect is very uncertain.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Evidence identified in the systematic reviews (see the "Availability of Companion Documents" field) for any given outcome was assessed. In brief, Grading of Recommendations Assessment, Development and Evaluation (GRADE) categorizes the quality of evidence as high, moderate, low or very low. These quality ratings apply to the body of evidence assessed for the PICO (patient/population, intervention, control, outcomes) question, not to individual studies. In general, evidence based on randomized controlled trials is given a high quality rating and evidence from observational studies is given a low quality rating. These initial ratings can be adjusted by the following factors:

- Study limitations such as concealment, blinding, type of analysis
- Consistency, namely whether the results from the different studies are similar and in the same direction of effect
- Directness, namely whether the population, intervention or comparator are the same as for the guideline under consideration
- Imprecision, namely whether data arise from a large or small population
- Reporting bias, namely whether there is a systematic underestimate or overestimate of the underlying beneficial or harmful effect due to the selective publication of studies or selective reporting of outcomes.

Other considerations, such as dose–response gradients, direction of plausible bias and magnitude of effect are also important.

Comments related to the domains that inform the assessment of the quality of evidence for each outcome are presented with respective GRADE tables.

Findings of research identified through this process were synthesized as GRADE tables (see Annex 1 in the original guideline document). GRADE tables were formulated only for outcomes that had been ranked as critical by the Nutrition Guidance Advisory Group. Data related to important outcomes were summarized in the narrative. In view of the paucity of data from randomized trials and the heterogeneity of definitions and interventions, it was not possible in most instances to undertake meta-analyses of results. Instead, findings from relevant studies are included in the tables.

Methods Used to Formulate the Recommendations

Expert Consensus (Consensus Development Conference)

Description of Methods Used to Formulate the Recommendations

This guideline was developed in accordance with the World Health Organization (WHO) evidence-informed guideline development procedures, as outlined in the *WHO handbook for guideline development* (see the "Availability of Companion Documents" field).

Formulation of Recommendations, Including Future Research Priorities

Draft recommendations are prepared by WHO staff. Following presentation of the systematic reviews, the Nutrition Guidance Advisory Group reviewed the draft recommendation and determined whether it is supported by the evidence. Nutrition Guidance Advisory Group and the external resources people met for this purpose on 2–4 June 2010, 14–16 March 2011 and 1–3 February 2012. In addition, the group considered: (i) desirable and undesirable effects of this intervention; (ii) the quality of the available evidence; (iii) values and preferences related to the intervention in different settings; and (iv) cost. The cost of options available to health-care workers in different settings was not formally assessed, owing to lack of primary data in the literature or elsewhere. However, cost implications were considered as part of general discussion by the Nutrition Guidance Advisory Group. There were no primary costing data included in the literature reviewed and hence comments were restricted to personal experiences and extrapolations from general cost considerations of programmes. The Nutrition Guidance Advisory Group also allocated a strength of recommendation, strong or conditional, which is reported as part of the guideline.

Advisory Groups

A WHO Steering Committee for Nutrition Guidelines Development, led by the Department of Nutrition for Health and Development, was established in 2010, with representatives from all WHO departments with an interest in the provision of scientific nutrition advice. The steering committee guided the development of this guideline and provided overall supervision of the guideline development process (see Annex 2 in the original guideline document).

The Nutrition Guidance Advisory Group – Subgroup on Nutrition in the Life Course and Undernutrition (see Annex 3 in the original guideline document) included experts from various WHO expert advisory panels and experts in the area of undernutrition and other disciplinary areas of expertise, taking into consideration a balanced sex mix, and representation from all WHO regions. Efforts were made to include content experts, methodologists, representatives of potential stakeholders (such as managers and other health professionals involved in the health-care process) and consumers. Representatives of commercial organizations may not be members of a WHO guideline group. The role of the guideline group was to advise WHO on the choice of important outcomes for decision-making and the interpretation of the evidence.

The group of external experts and key stakeholders (see Annex 4 in the original guideline document) were identified through a call for public comments and commented on the wording of the recommendations and were asked to highlight any missing evidence.

Scope of the Guideline, Evidence Appraisal and Decision-Making

A Nutrition Guidance Advisory Group meeting, convened in June 2010 in Geneva, Switzerland, prioritized the need for updating the guideline on the management of severely malnourished children. An initial set of questions to be addressed in the guideline was the critical starting point for formulating the recommendations; the questions were drafted by technical staff of the Department of Nutrition for Health and Development and the Nutrition Guidance Advisory Group, in collaboration with the World Food Programme, UNICEF and the Office of the United Nations High Commissioner for Refugees, based on policy and programme guidance needs of Member States and their partners. A risk–benefit format was used (see Annex 5 in the original guideline document).

Two other Nutrition Guidance Advisory Group meetings were held on 14–16 March 2011 and 1–3 February 2012, in Geneva, Switzerland, to review the evidence and discuss the draft recommendation, taking into consideration: (i) desirable and undesirable effects of these formulations; (ii) the quality of the available evidence; (iii) values and preferences related to the intervention in different settings; and (iv) the cost of options available to programme managers in different settings (see Annex 5 in the original guideline document). Consensus was defined as agreement by the simple majority of the guideline group members. WHO staff present at the meeting, as well as other external technical experts involved in the collection and review of the evidence, were not allowed to vote. There were no strong disagreements among the Nutrition Guidance Advisory Group members.

Rating Scheme for the Strength of the Recommendations

Strength of Recommendations

Strong recommendations: Strong recommendations communicate the message that the guideline is based on the confidence that the desirable effects of adherence to the recommendation outweigh the undesirable consequences. Strong recommendations are uncommon because the balance between the benefits and harms of implementing a recommendation is rarely certain. In particular, guideline development groups (GDGs) need to be cautious when considering making strong recommendations on the basis of evidence whose quality is low or very low.

Weak/Conditional recommendations: Recommendations that are conditional or weak are made when a GDG is less certain about the balance between the benefits and harms or disadvantages of implementing a recommendation. Conditional recommendations generally include a description of the conditions under which the end-user should or should not implement the recommendation.

Cost Analysis

The cost of options available to health-care workers in different settings was not formally assessed, owing to lack of primary data in the literature or elsewhere. However, cost implications were considered as part of general discussion by the guideline development group, namely the Nutrition Guidance Advisory Group members and the external resource people.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

A public call for comments on the final draft guideline was released. All interested stakeholders became members of the External Experts and Stakeholders Panel but were only allowed to comment on the draft guideline after submitting a signed Declaration of Interests form. Respondents were asked to comment on the clarity of the recommendations; on any additional evidence that might not have been included; and whether any of the recommendations were in conflict with the evidence base. Feedback was received from 20 stakeholders and external experts. World Health Organization (WHO) staff then finalized the guideline and submitted it for clearance by WHO before publication.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

The evidence available for the development of recommendations was in general of very low quality, as defined in the *WHO handbook for guideline development*. This was due to the limited availability of randomized controlled trials, trials comparing existing World Health Organization recommendations with new treatment options, or trials documenting comparisons of diagnosis and treatment methods identified by the guideline development group as requiring review. Where direct evidence was not available, indirect evidence from different population groups, or different intervention strategies has been noted, if appropriate, in the original guideline document.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Refer to Annex 5 in the original guideline document for the benefit or desired effect for each recommendation.

Potential Harms

Refer to Annex 5 in the original guideline document for the potential risks or undesired effects for each recommendation.

Qualifying Statements

Qualifying Statements

- The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization (WHO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.
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- This guideline does not reflect all WHO recommendations related to the management of children with severe acute malnutrition but only those related to areas that were prioritized by the guideline development group: the WHO Nutrition Guidance Advisory Group – Subgroup

on Nutrition in the Life Course and Undernutrition 2010–2012.

Implementation of the Guideline

Description of Implementation Strategy

Dissemination

The current guideline will be disseminated through electronic media such as slide presentations, CD-ROMs and the World Wide Web, either through the Global Inter-Agency Standing Committee Nutrition Cluster Working Group and United Nations Standing Committee on Nutrition (http://www.unscn.org/) mailing lists or the World Health Organization (WHO) nutrition web site (http://www.who.int/nutrition/en/). The WHO Department of Nutrition for Health and Development has developed an electronic Library of Evidence for Nutrition Actions (eLENA; http://www.who.int/elena/en/). This library aims to compile and display WHO guidelines related to nutrition, along with complementary documents such as systematic reviews and other evidence informing the guidelines, biological and behavioural rationales, and additional resources produced by Member States and global partners.

Adaptation and Implementation

The current guideline, together with other updated guidelines on child health will be the basis for updating the *WHO manual*, as well as the *WHO training course on the management of severe malnutrition*.

Countries have requested this updated guidance in order to revise their national protocols on severe malnutrition and to improve their capacity in the management of severe malnutrition.

Monitoring and Evaluation of Guideline Implementation

The impact of this guideline and the derivative products (the manual and the training course) can be evaluated within countries (i.e., monitoring and evaluation of the programmes implemented at national or regional scale) and across countries (i.e., adoption and adaptation of the guideline globally).

For evaluation at the global level, the WHO Department of Nutrition for Health and Development has a centralized platform for sharing information on nutrition action in public health practice implemented around the world. By sharing programmatic details, specific country adaptations and lessons learnt, this platform will provide examples of how guidelines are being translated into nutrition actions.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

World Health Organization (WHO). Guideline: updates on the management of severe acute malnutrition in infants and children. Geneva (Switzerland): World Health Organization (WHO); 2013. 115 p. [167 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2013

Guideline Developer(s)

World Health Organization - International Agency

Source(s) of Funding

The World Health Organization (WHO) acknowledges the financial support from the European Commission – Directorate General for Humanitarian Aid and Civil Protection (ECHO), the Government of Luxembourg and the Bill & Melinda Gates Foundation for this work. Donors do not fund specific guidelines and do not participate in any decision related to the guideline development process, including the composition of research questions, membership of the guideline groups, the conduct and interpretation of systematic reviews, or the formulation of recommendations.

Guideline Committee

Nutrition Guidance Advisory Group – Subgroup on Nutrition in the Life Course and Undernutrition

Composition of Group That Authored the Guideline

Members of the Nutrition Guidance Advisory Group – Subgroup on Nutrition in the Life Course and Undernutrition 2010–2012: Dr Tahmeed Ahmed, Nutrition Program, International Centre for Diarrhoeal Disease, Research, Dhaka, Bangladesh; Dr Beatrice Amadi, University Teaching Hospital, Lusaka, Zambia; Dr Paluku Bahwere, Independent, Belgium; Dr André Briend, Independent, Paris, France; Ms Hedwig Deconinck, Nutrition Adviser for Food and Nutrition, Technical Food and Nutrition Technical Assistance II Project (FANTA-2), Montpellier, France; Prof Alan Jackson, International Malnutrition Task Force, University of Southampton, Southampton, United Kingdom of Great Britain and Northern Ireland; Dr Marzia Lazzerini, Institute for Child Health, IRCCS BurloGarofolo, Trieste, Italy; Dr Mark Manary, St Louis Children's Hospital, St Louis, United States of America; Dr Jeremy Shoham, Emergency Nutrition Network (ENN), Oxford, United Kingdom of Great Britain and Northern Ireland

See Annexes 2 to 4 in the original guideline document for members of the World Health Organization (WHO) Steering Committee for Nutrition Guidelines Development, external resource people, the WHO Secretariat, and external experts and stakeholders.

Financial Disclosures/Conflicts of Interest

Management of Conflicts of Interest

According to the rules in the World Health Organization (WHO) *Basic documents*, all experts participating in WHO meetings must declare any interest relevant to the meeting prior to their participation. The Declarations of Interest statements from all Nutrition Guidance Advisory Group members were reviewed by the responsible technical officer and the relevant departments before finalization of the group composition and invitation to attend a Nutrition Guidance Advisory Group meeting. All Nutrition Guidance Advisory Group members and participants of the guideline development meetings submitted a Declaration of Interests form, along with their curriculum vitae before each meeting. In addition, they verbally declared potential conflicts of interest at the beginning of each meeting. The procedures for management of conflicts of interests strictly

followed the WHO *Guidelines for declaration of interests (WHO experts)*. The potential conflicts of interest declared by members of the guideline group are summarized below.

- Dr Paluku Bahwere is a medical doctor with over 20 years' experience in the fields of public health, paediatrics, nutrition and HIV/AIDS. He declared being the Valid International's research focal person until August 2010. Through operational research and the development and implementation of evidence-based approaches, Valid International is committed to increasing the impact of humanitarian action. Valid International provides specialized advisers to support programme implementation, evaluate programme impact and research humanitarian and development techniques. He has personally been involved in a wide range of research projects, including the integration of community treatment centres with other child survival strategies; the use of ready-to-use foods for HIV-positive adults; and the use of community treatment centres for providing HIV services and managing malnutrition in HIV-infected children and adults. Dr Bahwere clarified that through his work with Valid International, he had no connection with Valid Nutrition, an Irish-registered charity that makes a range of ready-to-use therapeutic food in Africa and that is linked to Valid International. It was considered that Dr Bahwere's work with Valid International would be reported in the guideline.
- Dr André Briend has extensive experience as researcher, programme manager and paediatrician. He was a member of technical staff in the Department of Child and Adolescent Health and Development WHO until 2010 and currently works as an independent consultant. Dr Briend was involved in development of the patent of the ready-to-use therapeutic food plumpy nut. He does not, however, own his product rights, and does not receive any royalties. The patent of the product belongs to Nutriset and Institut de Recherche pour le Développement. It was agreed that this would be reported in the guideline.
- Dr Mark Manary is Professor of Paediatrics at Washington University St Louis School of Medicine, United States of America. He is also director of the Global Harvest Alliance, a joint venture between the St Louis Children's Hospital and the Donald Danforth Plant Science Center. Dr Manary's research interests focus on different aspects of nutrition in populations of developing countries, especially in Malawi, Africa. He has declared that in the last 3 years he has been in the academic field and is founder of the nongovernmental organization Peanut Butter, which produces ready-to-use therapeutic food for use in programmes in Malawi and Sierra Leone. Peanut Butter is a charitable project, which sells the ready-to-use therapeutic food on a cost-recovery basis to governments and agencies, which in turn distribute it free of charge to malnourished children. It was considered that Dr Manary's work on the humanitarian Project Peanut Butter would be reported in the guideline.

External resource persons were invited to the meetings as observers and to provide technical input, but they did not participate in the decision-making processes.

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Electronic copies: Available from the World Health Organization (WHO) Web site .

Print copies: Available from the WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland; Phone: +41 22 791 3264; Fax: +41 22 791 4857; E-mail: bookorders@who.int.

Availability of Companion Documents

The following are available:

- Picot J, Hartwell D, Harris P, Mendes D, Clegg AJ, Takeda A. The effectiveness of interventions to treat severe acute malnutrition in young children: a systematic review. Health Technol Assess. 2012 Apr;16(19):1-316. Electronic copies: Available from the National Institute for Health Research (NIHR) Web site .
- WHO handbook for guideline development. Geneva (Switzerland): World Health Organization (WHO); 2014. 167 p. Electronic copies: Available from the WHO Web site .

The nine background reviews commissioned for this guideline are available from the WHO Web site .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on March 24, 2015.

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